



Montana DNRC Forestry Division

FORESTRY ASSISTANCE

Biomass Utilization

Forest Pest Management

Forest Practices

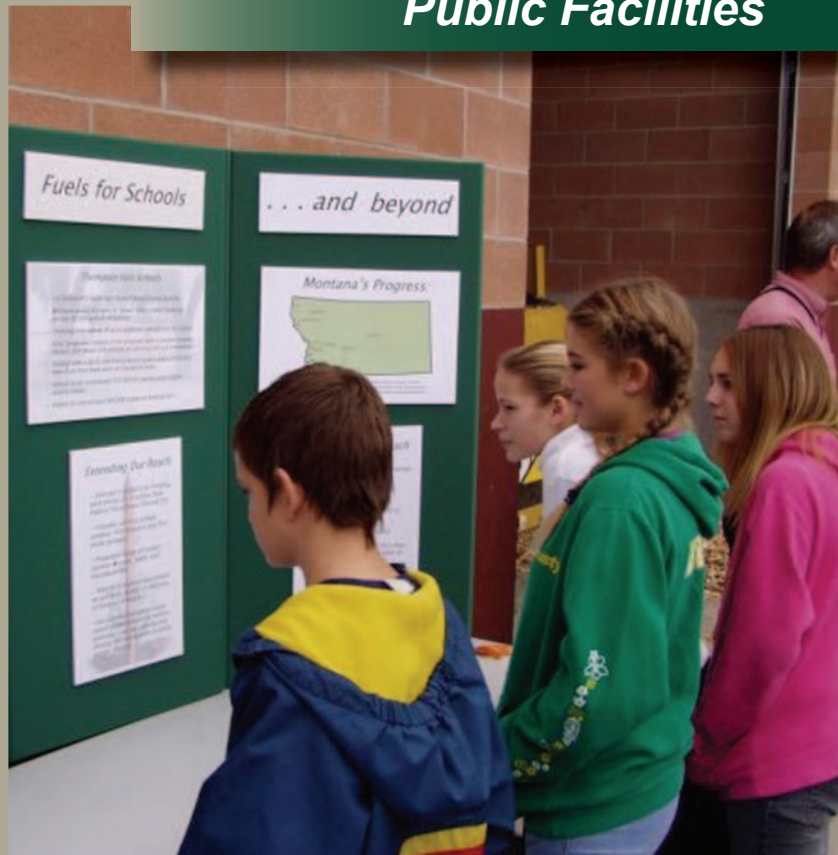
Forest Stewardship

Montana Conservation
Seedling Nursery

Urban and Community
Forestry

Biomass Utilization Fuels for Schools and Beyond

*Promoting Healthier Forests and
Communities by Using Waste Wood
to Heat Schools and other
Public Facilities*



Montana Department of Natural Resources and Conservation Forestry Division Forestry Assistance Bureau Biomass Utilization Fuels For Schools and Beyond

Fuels For Schools and Beyond (FFS&B) is an innovative program designed to promote healthy communities and forests by encouraging schools and other public and non-profit facilities to use biomass heating systems that burn waste wood from hazardous fuels treatment projects. The program involves a partnership among the Montana DNRC Forestry Division, USDA Forest Service State and Private Forestry, the State Foresters of Montana, Idaho, Nevada, North Dakota, and Utah, and the Bitter Root Resource Conservation and Development Area.

Fuels For Schools and Beyond currently is in the second phase of a planned three-phase program. The first phase involved establishing a demonstration project in each of the five states. During phase two, additional biomass boilers are being installed, and phase three will involve transition of primary funding from the USDA Forest Service to the private sector. During this second phase, DNRC FFS&B staff provide technical assistance and advice to facilities interested in exploring the feasibility of converting to a biomass boiler, including arranging for engineering assessments and identifying forest biomass suppliers. DNRC administers a competitive grants program funded by the USDA Forest Service through which facilities can apply for funding to help cover the costs of biomass boiler systems, and FFS&B staff help facilities identify additional sources of funding.

Goal

Promote and facilitate the use of forest biomass waste as a renewable heat and energy source.

Renewable Energy from Waste Wood Saves Money and Improves Environmental Health

Nearly 90% of the boilers used to heat Montana schools and other public facilities are fueled by natural gas. Rising natural gas prices require ever-increasing expenditures from communities; money spent on heating costs is not available for school supplies or hiring additional teachers. At the same time, many of Montana's forests suffer from hazardously high fuel densities, putting them at risk for catastrophic wildfires. Hazardous fuels treatment projects typically produce large quantities of unmerchantable wood waste. Converting to biomass boilers fueled by wood waste from hazardous fuels treatment projects can help solve both problems. Wood chips are a low cost, abundant fuel source, and cost about one-third the price of natural gas per BTU of heat produced. Burning slash in state-of-the-art boilers releases far fewer pollutants than open burning or wildfires. Demonstration projects have proven the viability and cost savings of biomass boilers; the potential to replicate this success at other sites is huge. A recent report identified nearly 100 facilities throughout Montana where conversion to biomass boilers would have a payback period under 10 years.

Program Accomplishments

Projects operational	4
Projects underway (in design or construction)	8
Projects funded	12
Preliminary engineering assessments completed	23
Grants administered	8
Estimated annual CO ₂ offset (in metric tons)	5,134



The Fuels For Schools and Beyond Program in Montana

The wildfires of 2000 burned over 350,000 acres and 70 structures in the Bitterroot valley, underscoring the urgent need for fire hazard reduction projects in the wildland urban interface. Because so many areas were in need of treatment, one Darby resident began to research ways that fuels treatment projects could promote local economic development. He discovered that waste wood was being used to heat a number of schools in the northeastern U.S., and approached community leaders with the idea of using slash from hazardous fuels treatment projects to heat Darby's schools.

With the aid of a grant from the USDA Forest Service and assistance from the Bitter Root Resource Conservation and Development Area, the USDA Forest Service Forest Products Laboratory, and the Biomass Energy Resource Center, a biomass boiler system was planned, designed, and installed in Darby and began heating the community's three schools in the fall of 2003.

Exciting Firsts For FFS&B in MT:

- **First project incorporating biomass heat in new construction: Glacier High School in Kalispell**
- **First pellet-fired boilers: Troy and Townsend schools**
- **First college campus system: University of Montana-Western in Dillon**
- **First hospital: Central Montana Medical Center, Lewiston**

Fuel cost savings were \$34,000 during the biomass boiler's first year of operation, and \$90,000 the winter of 2005-2006. Approximately 70 acres of hazardous fuels treatment is sufficient to provide Darby Schools' annual fuel supply.

Three more Montana schools now have operational biomass boilers, and an additional 8 projects are underway. The Darby Schools project continues to serve as a valuable demonstration and test site. Darby Schools' facilities manager and students have given dozens of tours

of the facility, experimented with a variety of fuel types, gathered data on maintenance and operations, and tested the stockpiling of fuel. Their efforts have provided important information for the FFS&B program, and students have gained valuable hands-on experience as part of the science curriculum.



Darby Schools, site of Montana's first FFS&B project

"With recent increases in fuel costs and improved efficiencies in chip storage, this system will save our school district \$100,000 in heating costs this year. That's good for the taxpayer, the community, our local businesses, and our forests."

Rick Scheele,
School District Facilities Manager
and City Mayor
Darby, MT

Fuels for Schools and Beyond Projects in MT	Status	Annual Wood Fuel Use (tons)	Estimated Annual Savings	Date Operational
Darby Public Schools	Installed	750	\$100,000	11/03
Victor Public Schools	Installed	500	\$31,898	9/04
Philipsburg Public Schools	Installed	400	\$67,558	1/05
Thompson Falls Public Schools	Installed	400	\$60,000	10/05
Troy Public Schools	Underway	60 (pellets)	\$12,500	11/06
Townsend Elementary and H.S.	Underway	250 (pellets)	\$19,500	11/06
University of Montana-Western	Underway	3,600	\$118,000	1/07
Glacier High School	Underway	1,900	\$65,000	1/07
Central Montana Medical Center	Underway	2,000	\$100,670	9/07
Deer Lodge Elementary School	Funded	730	\$39,980	3/07
Eureka Public Schools	Funded	960	\$103,610	12/07
New Browning High School	Funded	1,250	\$48,600	3/09



How FFS&B Biomass Heating Systems Work

1. Sources of wood fuel can include slash generated from hazardous fuels treatment projects, forest management activities, and timber operations, as well as residues from urban tree trimmings, right of way clearings, and wood manufacturers and sawmills.
2. Wood waste is run through a chipper to create wood chips.
3. The wood chips are transported to schools and other sites with biomass boilers.
4. Chips are fed into state-of-the art, efficient boilers that generate heat while producing far fewer pollutant emissions than open burning of the same material.

Community Benefits

- Facility heating costs are reduced by 30% - 70%
- Reduced fire danger
- Lower costs to landowners for hazardous fuels treatment
- New jobs in forests and communities
- Hands-on resource education in public schools
- Renewable local fuel source increases energy independence

Environmental Benefits

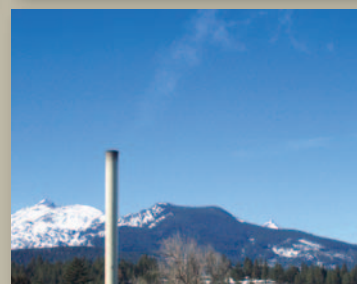
- Improved forest health
- Better air quality as burning wood in efficient boilers reduces slash burning and wildfire emissions
- Reduction in net greenhouse gas emissions



Above: Darby students perform a moisture content test on wood chips.



Top right: Open burning produces large quantities of smoke and pollutants.



Bottom right: Steam is normally the only visible emission from modern biomass boilers.

Success of Initial Projects Bodes Well for the Future

Work to date has demonstrated the economic and environmental viability of biomass heating systems, and offers the vision of a future where biomass will be a commonplace option to consider when choosing a heating system. The USDA Forest Service was instrumental in funding the first several demonstration projects and has provided an additional \$2 million in competitive grants in Montana since 2005. As the program goes forward, federal funding will be phased out as a market is established. The initial demonstration projects and projects coming online during the expansion phase have been important test

and educational sites for investigating different types of systems and fuel types, system installation issues, and fuel processing and transportation options. When the program moves into the final privatization phase, it is expected that the knowledge and experience gained during the demonstration and expansion phases will be key resources as more facilities explore the option of biomass heating, and that the private sector will have the knowledge and capacity to meet the demand for new systems. The collaboration, investment, and hard work of the FFS&B partners will pay many dividends in terms of healthier Montana communities and forests.